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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/566,289 | 01/27/2006 | Andreas Filzwieser | Becker1014US | 5466 |

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| EXAMINER | |
|---|---|
| SHEVIN, MARK L | |

| ART UNIT | PAPER NUMBER |
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| 1793 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/566,289 | FILZWIESER ET AL. | |
| | Examiner | Art Unit | |
| | Mark L. Shevin | 1793 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/27/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Status*

**1.** Claims 1-10, filed January 27th, 2006, are pending.

### *Information Disclosure Statement(s)*

**2.** The information disclosure statement (IDS) submitted January 27th, 2006 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement and has been considered by the examiner. Please refer to applicants' copy of the 1449 submitted herewith.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

**3.** **Claims 1-5 and 9-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Mackey** (US 4,544,141) in view of **Marcuson** (US 4,830,667).

Mackey is drawn to a continuous process and apparatus for converting non-ferrous mattes where an air, oxygen, or oxygen-enriched air is continuously

blown into the melt contained in the converter (Abstract). The process may be used to produce blister copper or white metals from a copper-iron-sulphide matte (col. 5, lines 63-65).

With respect to step a, Oxygen is blown into the melt through tuyeres submerged below the melt surface as the liquid feed matte is charged into the converter (col. 5, lines 50-55).

With respect to step b and c, Flux is added to the melt and the resultant slag is removed from the top of the melt and a refined product from beneath while continuously blowing oxygen through the melt (col. 5, lines 55-61). The slag is removed using a discharge port **30** at the end of the converter away from the tuyeres **18** (col. 6, lines 13-15 and col. 7, lines 14-18).

With respect to step d, the refined product (blister copper) is removed from the melt while oxygen is blown into the melt (col. 5, lines 60-62).

With respect to step e, the converter is emptied to a downstream unit as the slag and refined product are continually withdrawn from the converter, thus allowing is to remain in the blowing position during all stages of the conversion process (col. 7, lines 15-41).

With respect to step f, see steps a, b, c, and e above.

Thus Mackey teaches a method for the pyrometallurgical production of copper where the converter is charged with a copper containing melt, that follows the instant steps as claimed in claim 1, however Mackey does not teach that the melt consists predominantly of $Cu_2S$, however:

Marcuson, drawn to a process of converting copper by contacting the melt with a combination of oxidizing gas and inert gas (Abstract), teaches that during slagging, which involves the elimination of iron as iron oxides which are slagged with a flux, until the melt left in the converter consists essentially of white metal which is predominantly $Cu_2S$ (col. 1, lines 24-28).

Furthermore, Mackey teaches that a matte phase consists of metal sulphides and a slag and that the slag is subsequently discarded while the sulphide matte is removed and transported to a converter (col. 1, lines 12-21). The point of adding the flux and removing the slag is to remove iron and other impurities.

Thus is would have been obvious to one of ordinary skill in copper refining, at the time of the invention, taking the disclosures of Mackey and Marcuson as a whole, to treat the melt in such a way that predominantly copper sulfide remains in the melt as Marcuson teaches that the goal of slagging is to accomplish just that and Mackey teaches slagging with flux. Thus as the impurities are turned into slag, the matte that remains is predominantly sulfides, which for copper is $Cu_2S$ as taught by Marcuson. Furthermore, it would have been obvious to one of ordinary skill in the copper arts to have the melt consist predominantly of $Cu_2S$ as it is well-known that this species is converted to free copper as oxygen blown into the converter removes sulfur to form $SO_2$ which then is purged from the converter. Mackey teaches that the oxidation of the feed matte to produce the desired product (blister copper) produces a steady stream

of sulphur dioxide ($SO_2$) which is exhausted from the converter (col. 7, lines 27-29).

Regarding claims 2-5, as explained in the rejection to claim 1, Mackey teaches that a gas, which may be oxygen is blown through the melt during all four of these steps. Using a gas of consisting predominantly of oxygen would have been obvious to one of ordinary skill in the art as Mackey suggests using oxygen.

Regarding claim 6, Mackey teaches that air, oxygen-enriched air, or oxygen may be used as the gas and air and oxygen-enriched air will inherently contain an inert gas content.

Regarding claims 7, Mackey discloses a plurality of gas rinsing elements in the form of tuyeres **18**. These tuyeres blow gas into the converter during the conversion process at a rate in balance with the rate of liquid matte fed into the reaction and the desired degree of oxidation (col. 5, lines 49-56). Furthermore, Mackey teaches that the levels of the matte and slag phase are maintained by adjusting the ratio of oxygen supplied to the amount of liquid feed matte. Thus Mackey teaches that the tuyeres can be charged in a preselectable combination, namely all running at once, and that the same or different gases can be used, namely air, oxygen-enriched air.

Regarding claim 9, Mackey teaches that the process has gas continuously blown into the converter (Abstract).

Regarding claim 10, Marcuson teaches that the gas is introduced in a different composition during the individual process steps, namely that the inert gas sparging is conducted after oxygen injection ceases (col. 2, lines 60-63).

**4.** **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Mackey** as applied to claims 1-7 and 9-10 above, in further view of **Mancuso** (US 5,360,204)

Mackey teaches that a first discharge port at the end away from the gas-injecting tuyeres for removing slag from the top of the melt (col. 6, lines 13-17), however he does not teach the introduction of gas moves the slag in the direction of a removal opening.

Mancuso, drawn to a process of removing slag from a body of molten iron, injects gas into the molten iron to concentrate the slag on the surface adjacent the side for removing the slag to facilitate removal thereof (Abstract -- see Fig. 2 and Fig. 4 as well). Mancuso teaches that there is a great need for a method and apparatus that permits the removal of slag from molten metal in a highly efficient manner (col. 1, lines 52-55).

Steel, like copper, is subject to refining steps such as desulfurization to remove contaminants from the metal. The refining steps result in a layer of slag accumulating on the surface of the molten metal (col. 2, lines 22-27).

An inert gas, or a reactive gas if one desires to flux simultaneous, (col. 3, lines 39-45) is injecting through lance **32** into molten metal **6** which concentrates slag **24** in the area adjacent to a removal opening, spout **8** (col. 3, lines 15-20).

It would have been obvious to one of ordinary skill in the copper refining arts, at the time the invention was made, taking the disclosures of Mackey and Mancuso as a whole, to introduce the gas in such a way that the slag is pushed in the direction of a removal opening as Mancuso teaches such a process as highly efficient in removing slag.

***Conclusion***

**5.** The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

A. Filzwieser et al. The COP KIN® Part I: Fundamentals and Mathematical Modelling, RHI-AG, p. 1-14.

T. Prietl et al. Productivity increase in a Peirce-Smith converter using the COP KIN® and OPC system. *EPD Congress 2004*, edited by M.E. Schlesinger TMS (The Minerals, Metals & Materials Society) 2004, p. 1-14.

A. Filzwieser et al. MET KIN® - A gas purging system for metallurgical smelting furnaces. *Proceedings of EMC 2003*, p. 1-15

P.F. Queneau and S.W. Marcuson, Oxygen pyrometallurgy at Copper Cliff—A Half Century of Progress. *Journal of Metals*, vol. 48, no. 1, 1996, p. 14-21.

WO 2007/109822 A1 (Filzwieser)

US 2006/0119019 A1 (Taferner et al.)

US 4,085,923 (Queneau et al.)

**-- Claims 1-10 (All pending) are rejected**
**-- No claims are allowed**

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the texts of the references. To emphasize certain aspects of the prior art, only specific portions of the texts have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same

reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

All recited limitations in the instant claims have been met by the rejections as set forth above. Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark L. Shevin whose telephone number is (571) 270-3588. The examiner can normally be reached on Monday - Thursday, 8:30 AM - 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

**/Mark L. Shevin/**

**/Roy King/**

**Supervisory Patent Examiner, Art Unit 1793**

10-566,289
April 2nd, 2008